

Moult Patterns in three species of Small Victorian Mammals

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Moult involves loss and replacement of hair. Seasonal moults are common in mammals and produce either a thick, well insulated winter coat or a thinner summer pelage. As well, maturational moults which are associated with an animal's development are common in many mammals.

This report presents data on the comparative moult patterns in three small native mammal species trapped from the Central Highlands of Victoria: two dasyurid marsupials, *Antechinus stuartii* and *A. swainsonii*, and the murid rodent *Rattus fuscipes*.

MATERIALS and METHODS

The animals were caught in break-back traps during survey work from 1980-82 in tall open forest at Cambarville about 90 km north-east of Melbourne. Descriptions of habitat and climate can be found in Smith (1982, 1984) and Craig (1985).

The following measurements were made for each animal at time of capture: mass, body length, head-body length, pes length, testis length and reproductive condition of females. The skulls were removed and cleaned, dried and tagged, and stored in air tight containers.

Skins were removed in one piece, washed, rinsed, dried and stored. Hair replacement was detectable in the epidermis where pigment producing melanocytes accumulate before the maturation of the follicles (Ryder 1973). Such darkly pigmented areas were noted when present and moult patterns generalised from skins; 44 *A. stuartii*, 29 *A. swainsonii* and 25 *R. fuscipes* were examined.

RESULTS

Antechinus stuartii. Three phases in a late summer/autumn moult were detectable in *A. stuartii* (Fig. 1.). Patches of new fur grow on the venter (phase 1) and quickly spread over all the ventral surface and begin to grow on the dorsal surface (phase 2). The first two phases occur rapidly before or during early February. In the third phase, which, in the population studied, takes most of February and March, moult occurs over the rest of the dorsal and head surfaces but has been completed on the ventral surface.

A. stuartii also has a spring moult in October. It is less complete than the earlier moult, occurring in patches on the ventral and dorsal surfaces and especially on the head and shoulders.

Antechinus swainsonii. The three phases in the late summer/autumn moult of *A. swainsonii* (Fig. 1.) are similar to those in *A. stuartii*. However, animals show evidence of this moult from mid-December till mid-April. The spring moult occurs from mid-September to mid-November. It is less complete than the earlier moult, but unlike that in *A. stuartii*, seems to be divisible into the three obvious phases.

Rattus fuscipes. Two moults occur in *Rattus fuscipes*, each divisible into four phases (Fig. 2). The first moult begins in late February and ends in late May. Moult begins on the ventral surface in a large patch that extends to the head (phase 1). It then completes the venter and spreads to the dorsal surface via the shoulders and head (phase 2). The third phase is characterised by the completion of the hair replacement on the venter, shoulders and head and most moult occurs on the dorsal surface. The final phase, which persists for about two months, consists of moult in patches of the dorsal surface.

The second moult occurs early in November till late December and may only consist of limited hair replacement on the dorsal surface (i.e. phase 4).

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DISCUSSION

The summer seasonal moult of *R. fuscipes* is similar to the maturational moult of *Pseudomys novaehollandiae* except that the former has a moult in the anterior region of the body at an earlier stage than in *P. novaehollandiae* (Table 1). Kemper (1976) found a moult occurs in *P. novaehollandiae* between January and June which produces the typical winter pelage. Also, *R. fuscipes* experiences a final moult phase in which dark patches remain on the epidermis of the dorsal surface for a long time. Kemper (1976) suggested the spring moult in *P. novaehollandiae* is simply a result of thinning of underhairs by loss rather than production of a new pelage. The spring moult of *R. fuscipes* supports this view — only phase 4 was observed indicating that in this species there is only limited growth of new fur.

The late summer/autumn seasonal moult of *Antechinus* spp. differs from the maturational moult of *P. novaehollandiae* in that the marsupials experience a moult in the anterior of the body at a relatively earlier phase than that observed in *P. novaehollandiae*. The three species show overall similarities in moulting, particularly in that moult begins on the ventral surface, spreads to the sides and finishes on the dorsal surface.

Table 1 summarises breeding and moulting times in four small native mammals of eastern Australia: *A. stuartii*, *A. swainsonii*, *R. fuscipes* (this study), and *P. novaehollandiae* (Kemper 1976). Both seasonal moults occur one month earlier in *A. swainsonii* than in *A. stuartii*. The former species breeds one month earlier than *A. stuartii* in the study area (Wakefield and Warneke 1963 and 1967).

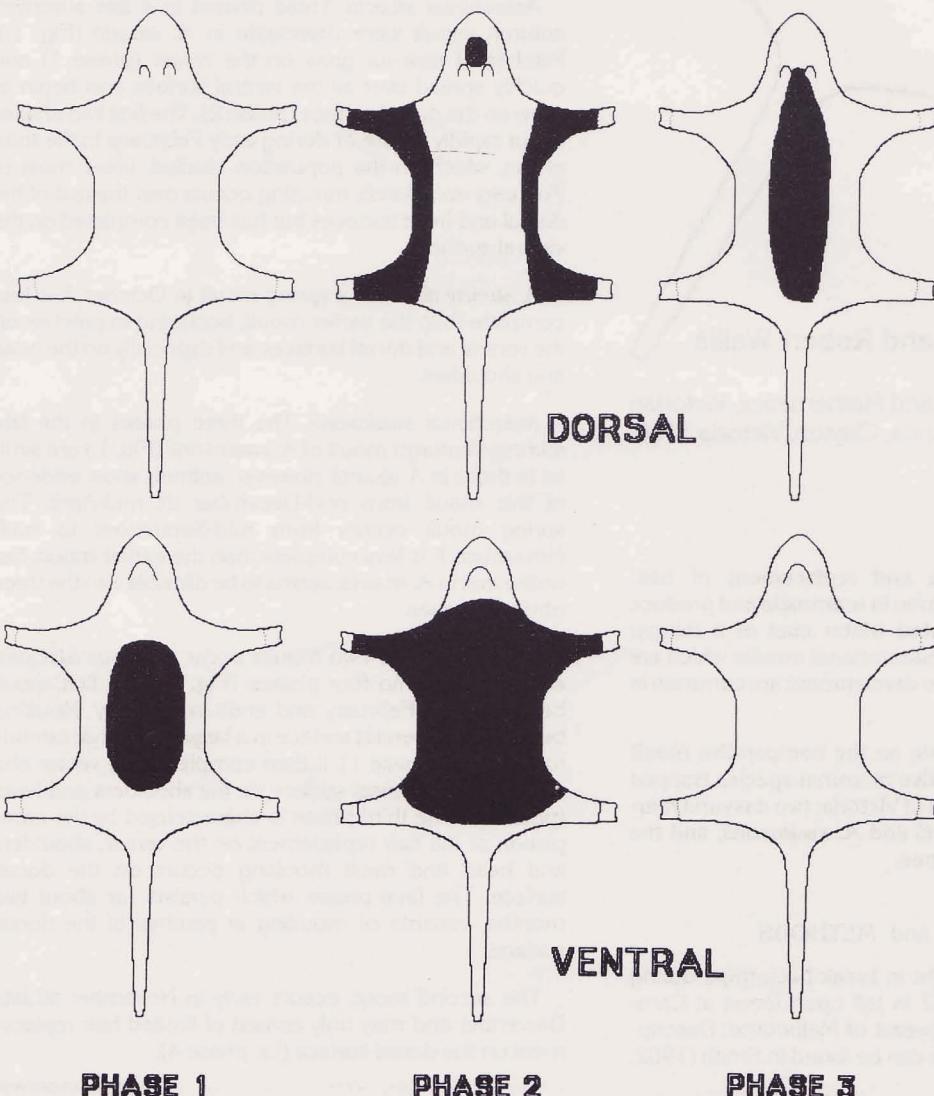


Fig. 1. Phases of the late summer/autumn seasonal moult in *Antechinus stuartii* and *A. swainsonii*. Dark areas indicate parts of the body in process of fur replacement. Adapted from Kemper (1976).

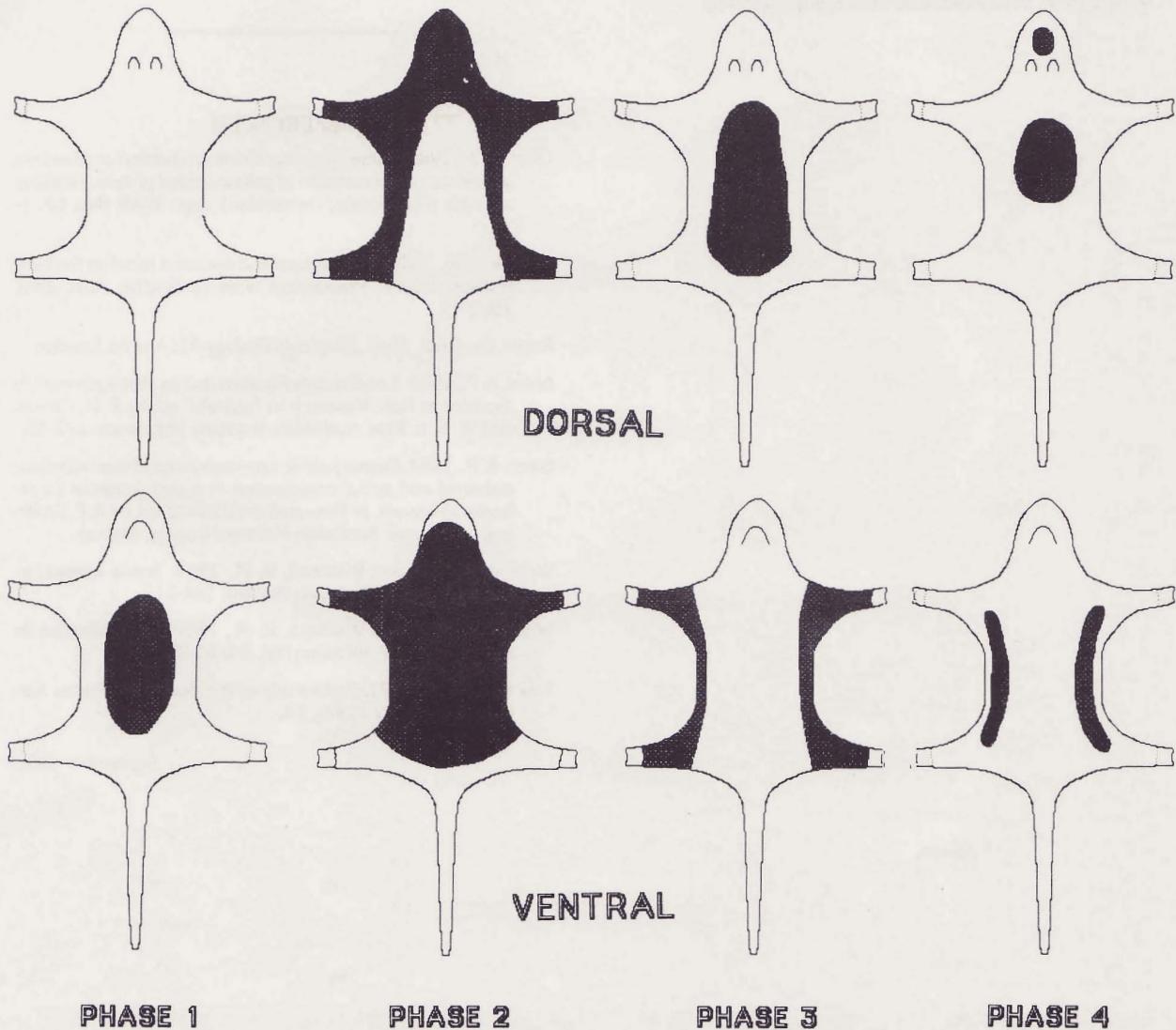
Fig. 2. (Opposite page) Phases of the late summer season moult in *Rattus fuscipes*. Dark areas indicate parts of the body in the process of fur replacement. Adapted from Kemper (1976).

Hence, it is possible that this first moult in *Antechinus* is in fact maturational. The distinction between maturational and seasonal moults is somewhat blurred because of the tightness of breeding seasons in these marsupials. Moult-
ing in both species is finished by mid-April.

The summer/autumn moults in the two rodents are spread over a longer time than for the dasyurids. This may simply reflect the longer breeding seasons in the rodents and also suggest that the stage of an animal's development can influence its timing of onset of moulting.

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PHASE 1

PHASE 2

PHASE 3

PHASE 4

Table 1. Timing of breeding and moulting in four small mammals from eastern Australia.

	<i>Antechinus stuartii</i>	<i>Antechinus swainsonii</i>	<i>Rattus fuscipes</i>	<i>Pseudomys novaehollandiae</i> #
Breeding season*	September 14-30	August 14-30	January	September-December
Summer moult: first noted completed by	January 15 April 13	December 15 April 13	January 25 May 25	January June
Spring moult: first noted completed by	October 15 November 15	September 15 November 15	November 7 December 28	"spring" "spring"
Matustralian moult: age first noted age completed by				35 d 105 d

* breeding data from Wakefield and Warneke (1963 and 1967), Warneke (1971) and Kemper (1976).

Data for *P. novaehollandiae* from Kemper (1976).

REFERENCES

CRAIG, S. A., 1985. Social organisation, reproduction and feeding behaviour of a population of yellow-bellied gliders, *Petaurus australis* (Marsupialia: Dasyuridae). *Aust. Wildl. Res.* 12: 1-18.

KEMPER, C. M., 1976. Matustralian and seasonal moult in the New Holland Mouse, *Pseudomys novaehollandiae*. *Aust. Zool.* 19: 9-17.

RYDER, M., 1973. 'Hair', *Studies in Biology* 41: Arnold, London.

SMITH, A. P., 1982. 'Leadbeaters Possum and its management', in 'Species at Risk: Research in Australia' ed. by R. H. Groves and W. D. L. Ride. Australian Academy of Science. 129-45.

SMITH, A. P., 1984. Demographic consequences of reproduction, dispersal and social organisation in a population of Leadbeaters Possum, in 'Possums and Gliders' ed. by A. P. Smith and I. D. Hume. Australian Mammal Society, Sydney.

WAKEFIELD, N. A. AND WARNEKE, R. M., 1963. Some revision in *Antechinus* — 1, *Victorian Nat.* 80: 194-219.

WAKEFIELD, N. A. AND WARNEKE, R. M., 1967. Some revision in *Antechinus* — 2, *Victorian Nat.* 84: 69-95.

WARNEKE, N. A., 1971. Field study of the Bush Rat (*Rattus fuscipes*), *Wildl. Contr. Vic.*, 14.

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The Australian Plains Rat, *Pseudomys australis*, is one of the loveliest of Australian rodents found in our dry inland areas. Photo by H. Millen.

